CLAIMS

1. An automatic musical performance device comprising:

a musical instrument capable of presenting an acoustic performance;

a performance actuator for actuating the musical instrument based on an operating signal from outside;

a memory unit for storing automatic musical performance data wherein a plurality of musical note data are arranged in the order of sound generation;

a command unit for commanding progress of an automatic musical performance;

a commanding member equipped with the instrument and being capable of being operated by a player;

a detector for detecting an operational action of the commanding member between at least two points; and

a musical performance operation control unit, which has functions or data map tables stored therein, which makes a calculation on detection results based on mapping relationships in the functions or the data map tables, which sequentially reads out musical note data forming an automatic musical performance data from the memory unit whenever the command unit gives a command, and which outputs each operating signal to the performance actuator based on the read-out musical note data and the calculated values;

wherein the musical performance operation control unit finds a time period Tv between the two points based

on detection by the detector; a delay time fD(Tv), which is from reception of each operating signal by the performance actuator to commencement of an actual musical performance of the musical instrument by the performance actuator, is found based on the mapping relationship in a function or a data map table; a time period Ta, which starts when later detection of the detection is made and ends when the operational action of the commanding member is stopped, is found as fa(Tv) based on the mapping relationship in a function or a data map table; and each operating signal is transmitted to the performance actuator under such timing control that a transmission timing Ton comes at a time of lapse of "fa(Tv)-fD(Tv)" sec after the later detection.

2. An automatic musical performance device comprising:

a musical instrument capable of presenting an acoustic performance;

a performance actuator for actuating the musical instrument based on an operating signal from outside;

a memory unit for storing automatic musical performance data wherein a plurality of musical note data are arranged in the order of sound generation;

a command unit for commanding progress of an automatic musical performance;

a commanding member equipped with the instrument, being capable of being operated by a player and being similar to a keyboard having a longer stroke than an

ordinary keyboard;

a detector for detecting an operational action of the commanding member between at least two points, which are spaced in the stroke; and

a musical performance operation control unit, which has functions or data map tables stored therein, which makes a calculation on detection results based on mapping relationships in the functions or the data map tables, which sequentially reads out musical note data forming an automatic musical performance data from the memory unit whenever the command unit gives a command, and which outputs each operating signal to the performance actuator based on the read-out musical note data and the calculated values;

wherein the performance control unit finds, as detection values Tv, time intervals between detection signals based on the detection signals detected at the two points by the detector; a delay time fD(Tv), which is from reception of each operating signal by the performance actuator to commencement of an actual musical performance of the musical instrument by the performance actuator, is found based on the mapping relationship in a function or a data map table; a time period Ta, which starts when later detection of the detection is made and ends when the operational action of the commanding member is stopped, is found as fa(Tv) based on the mapping relationship in a function or a data map table; and each

operating signal is transmitted to the performance actuator under such timing control that a transmission timing Ton comes at a time of lapse of "fa(Tv)-fD(Tv)" sec after the later detection.

3. An automatic musical performance device comprising:

a musical instrument capable of presenting an acoustic performance;

a performance actuator for actuating the musical instrument based on an operating signal from outside;

a memory unit for storing automatic musical performance data wherein a plurality of musical note data are arranged in the order of sound generation;

a command unit for commanding progress of an automatic musical performance;

a detector comprising light emitting elements and light receiving elements, two pairs of which are located at two upper and lower positions to scan light in a horizontal direction at the two upper and lower positions above a playing portion of the musical instrument in order to detect an operational action of a player by preventing the scanned light from being received by the light receiving elements at the two positions; and

a musical performance operation control unit, which has functions or data map tables stored therein, which makes a calculation on detection results based on mapping relationships in the functions or the data map tables, which sequentially reads out musical note data forming an

automatic musical performance data from the memory unit whenever the command unit gives a command, and which outputs each operating signal to the performance actuator based on the read-out musical note data and the calculated values;

wherein the performance control unit finds, as a detection values Tv, time intervals between detection signals based on the detection signals detected by the detector; a delay time fD(Tv), which is from reception of each operating signal by the performance actuator to commencement of an actual musical performance of the keyboard instrument by the performance actuator, is found based on the mapping relationship in a function or a data map table; a time period Ta, which is equal to be half a time period starting when a lower light receiving element is prevented from receiving the scanned light and ending when the lower light receiving element is prevented from receiving the scanned light again by inversion of the operational action of the player, is found as fa(Tv) based on the mapping relationship in a function or a data map table; and each operating signal is transmitted to the performance actuator under such timing control that a transmission timing Ton comes at a time of lapse of "fa(Tv)-fD(Tv)" sec after the lower light receiving element is prevented from receiving the scanned light.

4. An automatic musical performance device comprising:

a musical instrument capable of presenting an

acoustic performance;

a performance actuator for actuating the musical instrument based on an operating signal from outside;

a memory unit for storing automatic musical performance data wherein a plurality of musical note data are arranged in the order of sound generation;

a command unit for commanding progress of an automatic musical performance;

a commanding member equipped with the instrument and being capable of being operated by a player;

a detector for detecting an operational action of the commanding member between at least two points; and

a musical performance operation control unit, which has functions or data map tables stored therein, which makes a calculation on detection results based on mapping relationships in the functions or the data map tables, which sequentially reads out musical note data forming an automatic musical performance data from the memory unit whenever the command unit gives a command, and which outputs each operating signal to the performance actuator based on the read-out musical note data and the calculated values;

wherein the musical performance operation control unit finds a time period Tv between two points, time intervals between two-point detection and later two-point detection and a tempo Tmp found by averaging the time intervals, based on detection signals at the two points

and later detection signals at the two points; a delay time fD(Tv), which is from reception of each operating signal by the performance actuator to commencement of an actual musical performance of the musical instrument by the performance actuator, and a velocity value fv(Tv, Tmp) are found based on mapping relationships in the functions or the data map tables; a time period Ta, which starts when later detection of the two-point detection as a reference is made and ends when the operational action of the commanding member is stopped, is found as fa(Tv) based on a mapping relationship in the functions or the data map tables; each operating signal is transmitted to the performance actuator under such timing control that a transmission timing Ton comes at a time of lapse of "fa(Tv)-fD(Tv)" sec after the later detection; and the velocity value is set at fv(Tv, Tmp).

5. The automatic musical performance device according to Claim 4, wherein the commanding member is similar to a keyboard having a longer stroke than an ordinary keyboard, the detector detects the operational action of the commanding member at two points, which are spaced in the stroke, and the performance control unit finds, as detection values Tv, time intervals between detection signals based on the detection signals detected at the two points by the detector.

6. The automatic musical performance device according to Claim 4, wherein the detector comprises light emitting

elements and light receiving elements, two pairs of which are located at two upper and lower positions to scan light in a horizontal direction at the two upper and lower positions above a playing portion of the musical instrument in order to detect an operational action of a player by preventing the scanned light from being received by the light receiving elements at the two positions; and the performance control unit finds, as a detection values Tv, time intervals between detection signals based on the detection signals.

7. An automatic musical performance device comprising:

a musical instrument capable of presenting an acoustic performance;

a performance actuator for actuating the musical instrument based on an operating signal from outside;

a memory unit for storing automatic musical performance data wherein a plurality of musical note data are arranged in the order of sound generation;

a command unit for commanding progress of an automatic musical performance;

a commanding member equipped with the instrument and being capable of being operated by a player;

a detector for detecting an operational action of the commanding member between at least two points; and

a musical performance operation control unit, which has functions or data map tables stored therein, which makes a calculation on detection results based on mapping

relationships in the functions or the data map tables, which sequentially reads out musical note data forming an automatic musical performance data from the memory unit whenever the command unit gives a command, and which outputs each operating signal to the performance actuator based on the read-out musical note data and the calculated values;

wherein the musical performance operation control unit finds a time period Tv between two points, time intervals between two-point detection and later two-point detection and a tempo Tmp found by averaging the time intervals, based on detection signals at the two points and later detection signals at the two points; a delay time fD(Tv), which is from reception of each operating signal by the performance actuator to commencement of an actual musical performance of the musical instrument by the performance actuator, and a velocity value fv(Tv, Tmp) are found based on mapping relationships in the functions or the data map tables; a time period Ta, which starts when later detection of the two-point detection as a reference is made and ends when the operational action of the commanding member is stopped, is found as fa(Tv) based on a mapping relationship in the functions or the data map tables; in case where it is assumed that a transmission timing Ton, when the operating signal is transmitted after later detection, is at a time of lapse of "fa(Tv)-fD(Tv)" sec after the later detection, when

the transmission timing has a negative value, each operating signal is transmitted to the performance actuator with a delay of one beat T_2 under such timing control that the transmission timing Ton comes at a time of lapse of "fa(Tv)+T_2-fD(Tv)" sec after the later detection in the two-point detection as the reference; and the velocity value is set at fv(Tv, Tmp).

8. The automatic musical performance device according to Claim 7, wherein the commanding member is similar to a keyboard having a longer stroke than an ordinary keyboard, the detector detects the operational action of the commanding member at two points, which are spaced in the stroke, and the performance control unit finds, as detection values Tv, time intervals between detection signals based on the detection signals detected at the two points by the detector.

9. The automatic musical performance device according to Claim 7, wherein the detector comprises light emitting elements and light receiving elements, two pairs of which are located at two upper and lower positions to scan light in a horizontal direction at the two upper and lower positions above a playing portion of the musical instrument in order to detect an operational action of a player by preventing the scanned light from being received by the light receiving elements at the two positions; and the performance control unit finds, as a detection values Tv, time intervals between detection

signals based on the detection signals.

10. An automatic musical performance device comprising:

a musical instrument capable of presenting an acoustic performance;

a performance actuator for actuating the musical instrument based on an operating signal from outside;

a memory unit for storing automatic musical performance data wherein a plurality of musical note data are arranged in the order of sound generation;

a command unit for commanding progress of an automatic musical performance;

a commanding member equipped with the instrument and being capable of being operated by a player;

a detector for detecting an operational action of the commanding member between at least two points; and

a musical performance operation control unit, which has functions or data map tables stored therein, which makes a calculation on detection results based on mapping relationships in the functions or the data map tables, which sequentially reads out musical note data forming an automatic musical performance data from the memory unit whenever the command unit gives a command, and which outputs each operating signal to the performance actuator based on the read-out musical note data and the calculated values;

wherein whenever the detector is turned on, signals are detected at the respective points; when it is

detected that all detection signals are off, detection signals at the two points and later detection signals at the two points are formed; the musical performance operation control unit finds a time period Tv between two points, time intervals between two-point detection and later two-point detection and a tempo Tmp found by averaging the time intervals, based on the detection signals at the two points and the later detection signals at the two points; a delay time fD(Tv), which is from reception of each operating signal by the performance actuator to commencement of an actual musical performance of the musical instrument by the performance actuator, and a velocity value fv(Tv, Tmp) are found based on mapping relationships in the functions or the data map tables; a time period Ta, which starts when later detection of the two-point detection as a reference is made and ends when the operational action of the commanding member is stopped, is found as fa(Tv) based on a mapping relationship in the functions or the data map tables; in case where it is assumed that a transmission timing Ton, when the operating signal is transmitted after later detection, comes at a time of lapse of "fa(Tv)-fD(Tv)" sec after the later detection, when the transmission timing has a negative value, each operating signal is transmitted to the performance actuator with a delay of one beat T_2 under such timing control that the transmission timing Ton comes at a time of lapse of

"fa(Tv)+T_2-fD(Tv)" sec after the later detection; and the velocity value is set at fv(Tv, Tmp).

11. The automatic musical performance device according to Claim 10, wherein the commanding member is similar to a keyboard having a longer stroke than an ordinary keyboard, the detector detects the operational action of the commanding member at two points, which are spaced in the stroke, and the performance control unit finds, as detection values Tv, time intervals between detection signals based on the detection signals detected at the two points by the detector.

12. The automatic musical performance device according to Claim 10, wherein the detector comprises light emitting elements and light receiving elements, two pairs of which are located at two upper and lower positions to scan light in a horizontal direction at the two upper and lower positions above a playing portion of the musical instrument in order to detect an operational action of a player by preventing the scanned light from being received by the light receiving elements at the two positions; and the performance control unit finds, as a detection values Tv, time intervals between detection signals based on the detection signals.